

## A DESCRIPTION OF TWO CHINESE BRAINS.

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OUR knowledge of the racial characteristics of brains is as yet so limited that the following study of two Chinese brains will not prove uninteresting.

The first Chinese brain ever described was presented at a meeting of the American Neurological Association June 21, 1886, by Dr. Chas. K. Mills,<sup>1</sup> together with Dr. A. J. Parker, the latter having previously exhibited it at a meeting of the Philadelphia Neurological Society. In January, 1887, Dr. Moritz Benedikt describes three additional Chinese brains.<sup>2</sup>

I propose briefly to describe the two specimens<sup>3</sup> in my possession, and then to compare the results with those of the writers just mentioned. I will designate these brains as Number One and Number Two.

I. *Number one* was the brain of, as far as could be learned, a quiet and intelligent laundryman about twenty-five years of age. Death had been caused by phthisis.

The brain was large and well proportioned. Unfortunately it was not weighed. The orbital surfaces of the frontal lobes and basal surfaces of the temporals seemed more oblique or shelving than usual, i. e., these surfaces seemed slightly everted.

*Right hemisphere.*—The Sylvian fissure is decidedly

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<sup>1</sup>Preliminary Study of a Chinese Brain. By A. J. Parker and Chas. K. Mills. JOURNAL OF NERVOUS AND MENTAL DISEASE, Vol. xiii., No. 10, 1886. (Embodied in the Address of Dr. Mills.)

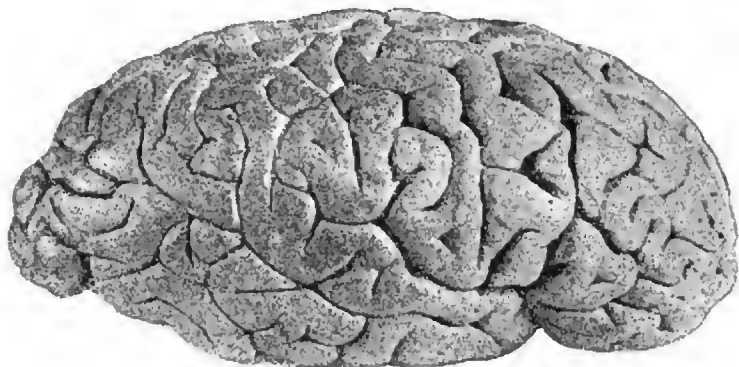
<sup>2</sup>Drei Chinesen Gehirne. Prof. Dr. Moritz Benedikt. Medizinische Jahrb., 1887.

<sup>3</sup>I am indebted for the opportunity of studying these brains to Dr. H. F. Formad, of Philadelphia.

short, though a superficial confluence greatly increases its apparent length. Its direction is average. Its anterior branch is confluent with the precentral, in fact constitutes with the latter one deep fissure. The horizontal branch terminates in two short branches one perpendicular and the other horizontal in direction. The fissure of Rolando is.



BRAIN No. I.—Right Half.



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average in direction, but decidedly sinuous, though not more so than is occasionally observed in some white brains. It is all but confluent with the Sylvian fissure, the operculum being here reduced to but little more than an eighth of an inch in width. Its upper end extends well into the medial surface. In its lower third a shallow fissure makes

it confluent with the precentral which at this point is somewhat irregular. The first frontal fissure is very sinuous and is confluent with a superior precentral, the latter being long and deep. A well-developed and sinuous medi-frontal is present, and is, together with the second frontal fissure which presents nothing remarkable, confluent with the precentral.

Immediately back of the fissure of Rolando is found an exceedingly sinuous retro-central. It runs quite parallel with the central except that it exaggerates the sinuosities of the latter. It arises close to the Sylvian and extends fairly up to the mesial edge of the hemisphere. In its middle portion it becomes confluent by a short transverse fissure with the anterior portion of the interparietal. The latter takes its origin in the gyrus included by the terminal bifurcation of the Sylvian, and ascends in an average direction but exceedingly sinuous course, and finally terminates in a very large and deep transverse occipital. It is not confluent with the parieto-occipital, though a deep and well marked external perpendicular fissure intersects it.

The parallel fissure is of unusual length and presents many confluences. It extends backward in an average direction, with but few shallow interruptions. Just back of the termination of the horizontal ramus of the Sylvian it gives off a well-marked perpendicular branch. A little farther on it becomes confluent with a more or less well-marked fissure of Wernicke. Finally it joins the transverse occipital, and then terminates in a fissure immediately below and parallel to this. This last mentioned fissure is very large and deep and looks like a vegetative repetition or reduplication of the normal transverse fissure. A deep notch at the basal edge of the occipital lobe forms an indication of a second Wernicke.

The mesial surface gives one the same general impression of complexity as does the lateral surfaces. The colosso-marginal fissure pursues an average course, but extends over half an inch on the lateral surface. It gives off numerous and irregular perpendicular branches, and the mesial surface of the first frontal convolution is made very

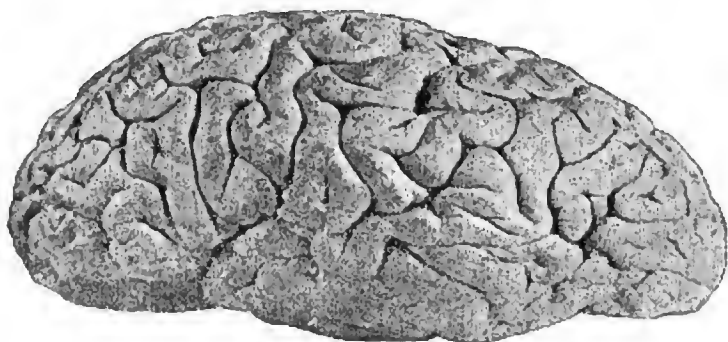
complex by their 4-shaped and b-shaped fissures. The paracentral lobule is divided transversely by a very deep and long fissure. The quadrate lobule, which is exceedingly large, is also rendered very complex by an abundance of transverse and perpendicular intersecting fissures. The parieto-occipital fissure is very sinuous, and enters directly into the hippocampal fissure, the gyrus fornicatus being entirely submerged. The calcarine is short and curved very strongly upwards. Its posterior termination is simple, i. e., no bifurcation is present. The cuneus is quite small and is made very complex by deep transverse fissuration. The lobulus fusiformis and lobulus lingualis are separated by a sinuous collateral and present in addition numerous and confluent secondary fissures.

*Left hemisphere.*—The Sylvian fissure is a little longer than its fellow of the opposite side. Its anterior branch is normal in appearance and not confluent with the precentral, as in the other hemisphere. The horizontal ramus again terminates in two short bifurcations. The fissure of Rolando is excessively sinuous and is *directly confluent with the Sylvian*. Its upper end extends fairly to the mesial edge of the hemisphere. The first and second frontal fissures are less sinuous than in the other hemisphere. The former is confluent with a long and deep precentral, while the latter is confluent with a smaller perpendicular fissure in advance. As in the other hemisphere a long and sinuous retro-central is present. It is, like the central, confluent with the Sylvian. The interparietal pursues an average direction, but its anterior and posterior portions are distinctly separated, and further, it fails to terminate in (i. e., become confluent with) the transverse occipital. As in the other hemisphere this last mentioned fissure is exceedingly deep and long.

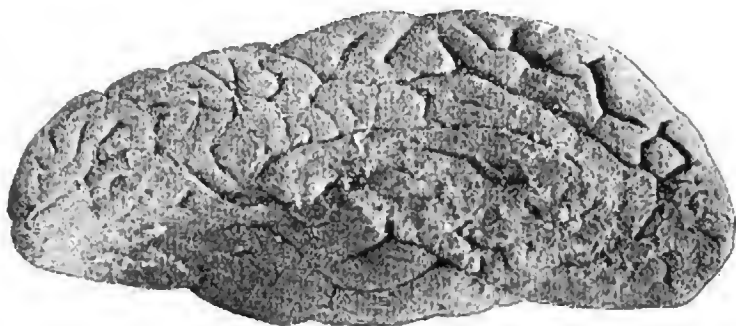
The parallel fissure, contrary to its fellow, is short; it is also exceedingly sinuous. In a direct line however with its course, we find a fissure confluent with a number of irregular fissures, among which are two perpendiculars. No vegetative repetition of the transverse occipital is present.

The mesial surface closely resembles that of the other

hemisphere. The calloso-marginal is very long and incises the lateral surface to the depth of fully an inch. The mesial surface of the first frontal though much marked by second-



BRAIN No. I.—Left Half.



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ary fisureation is less so than its fellow. The quadrate lobule bears a close resemblance to that of the other side. The parieto-occipital fissure is again very sinuous and again terminates directly in the hippocampal fissure. The gyrus fornicatus is not however wholly submerged. Further the parieto-occipital extends to an extraordinary degree upon the outersurface, namely, over an inch. A well defined *pli de passage inférieur externe* is however present. The calcarine fissure is as before strongly curved upward, and simple in its termination. The cunens though small is larger than that

upon the opposite side. Its surface bears an irregular secondary fissure.

The collateral fissure resembles closely its fellow. Secondary fissuration of the lobulus fusiformis and the lobulus lingualis is not however as marked.

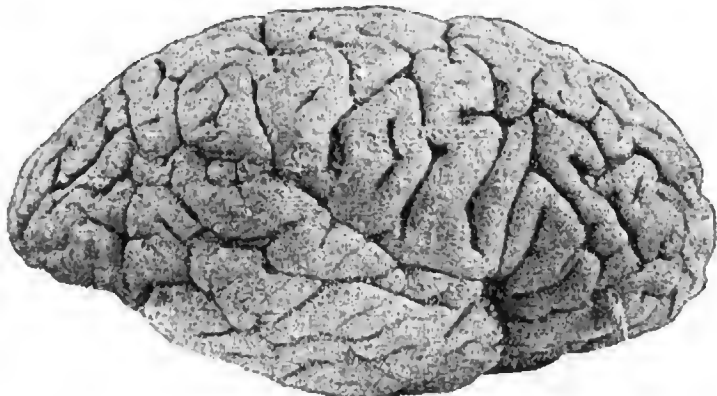
The orbital surfaces of both frontal lobes bear deep *h*-shaped fissures more complex in the right than in the left hemisphere.

II. *Number two* was the brain of a dissipated china-man, aged about thirty-five, who was found dead in an opium den.

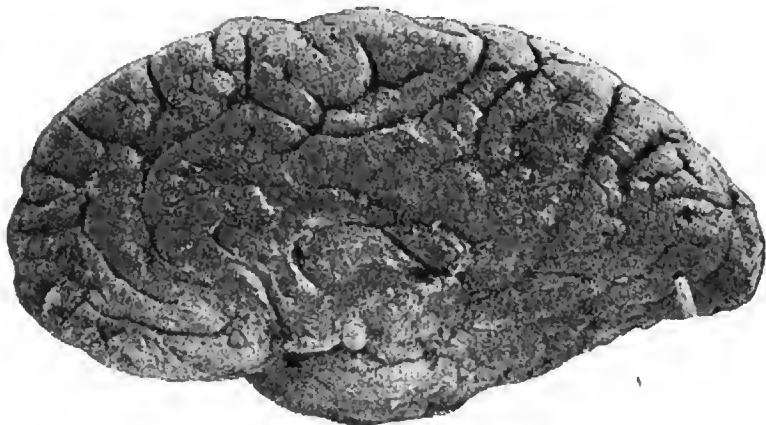
The brain is large and also well-proportioned. The orbital and basi-temporal surfaces likewise exhibit the oblique character noted in *Number one*.

*Right hemisphere.*—The Sylvian fissure is average in course and direction, though of unusual length. The fissure of Rolando is exceedingly sinuous. It is all but confluent with the Sylvian, being separated by a very narrow bridge. It extends fairly up to the mesial edge. The first frontal fissure does not begin in its usual position but at what would correspond to a junction of its lower and middle thirds. It is sinuous and interrupted, and finally terminates in an upper deep precentral. A deep and well-marked fissure runs from the mesial surface transversely across the frontal lobe immediately below the origin of the first frontal. A second fissure arises from the outer edge of the orbital surface, passes at first perpendicularly upward, joins the transverse fissure just described and thence follows the average course of the medi-frontal. By means of these fissures the tip of the frontal lobe is converted into a rectangular lobule, the surface of which still further presents well-marked transverse fissuration. The medi-frontal terminates in a large precentral. The third frontal is short and terminates in a perpendicular fissure which is parallel to and slightly in advance of the normal precentral. There are thus present in this hemisphere two precentral fissures, the most interior being a reduplication or vegetative repetition of the normal sulcus. This adventitious precentral, besides receiving the third frontal also intersects the medi-

frontal and is directly confluent with the Sylvian at a point posterior to the anterior ramus of the latter. The frontal lobe is made still further complex by the presence of a short fissure parallel to the third frontal and between it and the medi-frontal. Its inferior end is confluent with a shallow transverse fissure running into the Sylvian.



BRAIN No. II.—Right Half.



BRAIN No. II.—Right Half.

The interparietal has its origin in the Sylvian with which it is fairly confluent. After proceeding a short distance it sends a communicating branch to the fissure of Rolando, and a little farther on gives of a short retrocentral branch parallel to the latter. In its posterior portion it becomes fluent with the parieto-occipital, the *pli de passage enferieur*

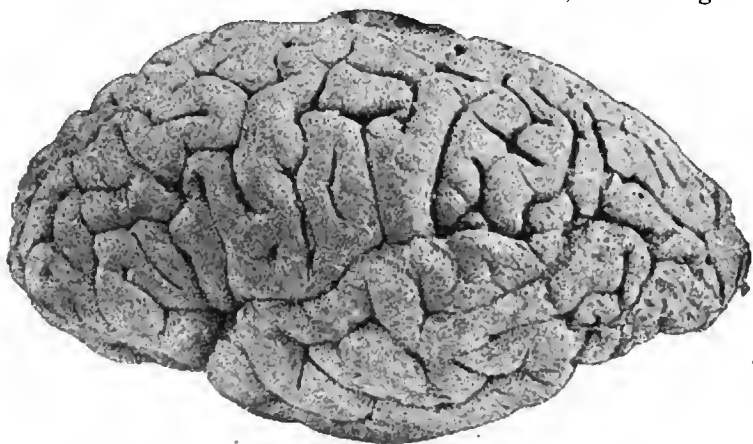
*externe* being entirely wanting. It finally terminates in a short transverse occipital. The parallel fissure is as in brain *Number one*, right hemisphere, exceedingly long, and finally becomes confluent with a typical external perpendicular fissure. Shortly in advance of this perpendicular fissure is found another, having the same general direction and intersecting the inter-parietal. Numerous other secondary fissures and markings having the same general direction are found. A vegetative repetition of the transverse occipital is also present. It exists directly below the normal fissure, is long and deep and extends over the mesial edge far into the cuneus.

The mesial surface presents, to begin with, a deep and very sinuous calloso-marginal. It gives off numerous perpendicular and irregular branches, especially into the paracentral lobule, and thence terminates freely upon the lateral surface. The quadrate lobule presents quite a number of characteristic fissures, but is not otherwise remarkable. The parieto-occipital fissure is very straight and as in the hemispheres of brain *Number one*, is directly confluent with the hippocampal fissure, the gyrus fornicatus being, as before, submerged. The calcarine presents nothing remarkable, its course being average and its posterior end being bifurcated. The cuneus is deeply incised by the adventitious transverse occipital already described. The collateral presents nothing worthy of note other than confluence with numerous transverse fissures.

*Left Hemisphere.*—The Sylvian fissure is decidedly sinuous, and, omitting a minute and shallow interruption, of excessive length. Its termination is vertical and slightly recurrent. The fissure of Rolando is average in course and direction. Like in the other hemisphere, it is separated from the Sylvian by an exceedingly narrow gyrus. The first and second frontal convolutions present an average appearance but are both confluent with the upper segment of the precentral, which is very long and well developed. A short medi-frontal is present. The lower segment of the precentral is comparatively small and not confluent with any of the frontal fissures, but directly so with the Sylvian



The excessive transverse fissuration so noticeable in the right frontal lobe is not evident here. A well-marked and deep retrocentral fissure is present. It arises directly from the Sylvian, and early in its course communicates by a horizontal branch with the central. Then, after a slight



BRAIN NO. II.—Left Half.



BRAIN NO. II.—Left Half.

interruption, it passes upward parallel with the central, and thence over the mesial edge for nearly an inch. The interparietal fissure likewise springs from the Sylvian, and like the retro-central is early interrupted by a narrow convolu-

tion. Thence it passes backward in an average direction but fails to terminate in the transverse occipital. Like its fellow of the opposite hemisphere, it also is confluent with the parieto-occipital, the *pli de passage superieur externe*, being as before, entirely absent. An external perpendicular fissure is likewise present, though it does not intersect the inter-parietal, as in the other hemisphere. The parallel fissure at first interrupted in its course becomes at its posterior extremity confluent with the external perpendicular fissure just mentioned. The transverse occipital is small and no reduplication of it exists. Two anomalous fissures running in a longitudinal direction from the apex of the occipital lobe forwards, join the external perpendicular.

The collosomarginal is not very sinuous. A marked tendency to repetition is found near its origin and also in the middle third of its course. It ends upon the mesial surface and in one or two places becomes quite shallow. The paracentral lobule bears an irregular *h*-shaped fissure. The quadrate lobule is large and its fissures numerous and deep. The parieto-occipital is long and straight, and as in the other hemispheres described, terminates directly in the hippocampal fissure, the gyrus fornicatus being as before submerged. The calcarine is average in course and direction. Its posterior extremity is bifurcated. The cuneus bears a small though deep fissure having sharp upward curve and presenting no confluence. The collateral presents nothing worthy of note. However, a deep and anomalous fissure extends from the apex of the temporal lobe just external to the uncinate gyrus in an oblique course backward and outward to the lateral surface, which it deeply incises at a point midway between the apex of the temporal and the apex of the occipital lobe. Its presence gives the base of the temporal lobe a very unusual appearance.

Comparing now, these results with those of the previous observers, we find in the first place, that the obliquity or eversion of the orbital surfaces spoken of by Mills and Parker is also very noticeable in both of these brains. Benedikt observed this fact independently of Mills and Parker in all three of his brains, and in addition stated that the basi-

temporal surfaces also partook of this quality. In the brains I have just described the same fact obtains. In brain *Number two* indeed the lateral surface of the temporal lobes is markedly increased by this eversion, the basal surface being narrowed down to little more than the hippocampal and uncinate gyri. In brain *Number one* the eversion is not marked at the time of writing, the brain having been somewhat distorted during the process of hardening, but it is evidently present.

This eversion of the basal surfaces is very significant, and having been observed in the six instances thus far studied seems to deserve the rank of a racial characteristic.

Mills and Parker mention in addition to various other minor peculiarities the extreme length and confluence of the parallel fissure which is noticeable also in both of my own specimens. They note also unusual complexity of the colosso-marginal of one side and instances of vegetative repetition in both ; points which these brains likewise show.

The Sylvian fissure is decidedly long in one of the hemispheres of Mills and Parker and very long in both hemispheres of *Number two* of my own specimens. Benedikt makes no especial mention of the relations of the Sylvian fissure, and it is somewhat difficult to judge from his drawings. However, I take it that very unusual length is not characteristic of the fossa in his brains.

The fissure of Rolando in the brain of Mills and Parker, judging from the photograph, was in both hemispheres very nearly confluent with the Sylvian. In Benedikt's brains, judging from the drawings, the same condition was present in the right hemisphere of his first brain, in both hemispheres of his second, and in the left hemisphere of his third brain. The same condition obtains in the right hemisphere of brain *Number one* of my own specimens, and in both hemispheres of brain *Number two*. Again, in the right hemisphere of Benedikt's third brain the central fissure is directly confluent with the Sylvian, This also obtains in the right hemisphere in brain *Number one*.

In the brain of Mills and Parker the inter-parietal presents nothing beyond a division by a bridging convolu-

tion into two parts. It was not confluent with the parieto-occipital. In the drawings of Benedikt, however, it is seen to be confluent with this fissure in three instances, twice in the same brain, the third, and once in the second. In my own specimens this confluence exists twice, namely: in both hemispheres of brain *Number two*. External perpendicular fissures are present in the brain of Mills and Parker, in all of my own specimens and apparently in some of Benedikt's.

Again, in the Mills-Parker brain, the parieto-occipital bears in the left hemisphere a normal relation to the hippocampal, i. e. it does not become confluent with the hippocampal, and the gyrus fornicatus is at this point fully up to the brain level. In the right hemisphere this confluence all but takes place, the gyrus fornicatus being reduced to a mere shred. In the brains of Benedikt this confluence is depicted as taking place twice, i. e., in both hemispheres of his first brain. In my own specimens this confluence takes place in every instance, the gyrus fornicatus being always completely submerged.

Benedikt states also that in the right hemisphere of his second brain the connection between the calcarine and the parieto-occipital is wanting. However, his drawing shows just the opposite, the normal confluence between these fissures being depicted. It is unfortunate that the drawing and the text do not agree, as this observation would be of extreme interest.

Further Benedikt remarks that the temporal and occipital lobes can each be very readily separated into four convolutions or lobules. This is not evident in the brain of Mills and Parker, though in my own specimens the temporal lobe can after some reflection be arranged into four parts; but this does not hold good of the occipital.

Benedikt also states that the central fissure is very sinuous and tends to confluence with the precentral or retrocentral. This observation can to a great extent be corroborated by my own specimens and that of Mills and Parker.

In attempting to generalize from an analysis of these

brains we must be exceedingly cautious. Nevertheless, these striking peculiarities appear to be present : They are, first, the eversion of the orbital and basi-temporal surfaces; secondly, the extreme sensuosity of the fissures; thirdly, the unusual confluxity, if not the unusual size of the frontal lobes. Regarding the excessive transverse fissuration, it may be remarked that it is also found in white brains, though far less frequently; and as regards the unusual confluences of fissures, we can certainly say that they are relatively rare in the white brain and very frequent here, and this becomes of some significance perhaps, when we recall that these conditions are very frequent in the brains of negroes, and largely obtain in the brains of the apes. This is especially true of the confluence between the parieto-occipital and the inter-parietal, that between the parieto-occipital and the hippocampal, the presence of a deep and well-differentiated external perpendicular and the consequent absence of the various external *plis de passage*.